REMARKS

Claims 1 through 23 are pending. Applicants respectfully traverse and request reconsideration.

DRAWINGS

The Office Action objects to the drawings with regard to claim 12. Per claim 12, the information generator 592 (see Fig. 5) produces location information 595 (see Fig. 5) to an echo canceler circuit 200 as shown in Fig. 5. Thus, all claimed elements are shown in Fig. 5 and no elements should be canceled from the claims. Reconsideration and withdrawal of the drawing objection is requested.

SPECIFICATION

According to the office action, it is not clear what the echo canceller coefficient logic 218, and echo canceller filter 216, the echo canceller adaptive filter 84 of Fig. 1 and the echo canceler coefficient logic 218 and filter 216 of Figs 2 and 4 are doing.

Echo canceler coefficient logic 218 produces the filter coefficient data 226 by adapting to changes in the pre-echo canceler uplink data 64 and pre-noise suppression uplink data. (Specification paragraph 28, Fig. 2, Fig. 4). The echo canceler adaptive filter typically employs a finite impulse response (FIR) filter having a set of weighting coefficients to model the acoustic coupling channel between the speaker and the microphone. (Specification paragraph 6, Fig. 2, Fig. 4). The echo canceler coefficient logic 218 includes a filter coefficient data generator 220 and adder logic 222. (Specification paragraph 24, Fig. 2, Fig. 4). On page 4 of the office action, the examiner admits that an echo canceler coefficient logic has the purpose of performing the echo cancel function. Thus, the specification clearly describes what the echo canceller coefficient logic 218 is doing.

The echo canceler filter (216) receives the noise suppressed uplink data (228) and the filter coefficient data (226) and in response produces final uplink data (230). (Specification paragraph 25, Fig. 2, Fig. 4). Since the echo canceler filter 216 receives the noise suppressed uplink data 228 from the noise suppression logic 212, the echo canceler filter 216 may perform the adaptive filter function on the noise suppressed uplink data 228 by applying the filter coefficient data 226 previously produced. (Specification paragraph 30, Fig. 2, Fig. 4).

According one example, the pre-echo canceller uplink data 64 includes echo component data 240 and noise component data 242, such that the echo canceler filter 216 produces the final uplink data with reduced echo component data 240. (Specification paragraph 31, Fig. 2, Fig. 4). As previously stated, the noise suppression logic 212 produces the noise suppressed uplink data 228 with reduced noise component data 242 without being affected by the generation of the filter coefficient data 226 produced by the echo canceler coefficient logic 218. Id.

Although the echo canceler filter 216 receives the noise suppressed uplink data 228 from the noise suppression logic 212, the generation of filter coefficient data 226 is unaffected by the noise suppression logic 212. (Specification paragraph 46, Fig. 2, Fig. 4). Therefore, the echo canceler filter 216 may perform the adaptive echo cancellation function on the noise suppressed uplink data 228 based on the independently generated filter coefficient data 226. Id. As a result, the echo canceler filter 216 produces final uplink data 230 that has both been processed for echo cancellation and noise suppression, such that these functions are performed in a non-interfering manner. Id. Since the noise suppression function is not introduced until after the modeling of the acoustic coupling channel 72 and the generation of filter coefficient data 226, the generation of the filter coefficient data 226 is independent of the generation of the noise suppressed uplink data. Id. Thus, the specification clearly describes what the echo canceler filter 216 is doing.

The office action states "none of the echo canceller blocks 84, 216 or 218 receive any signals from downlink data 52. What echo are they canceling? Echo cancelers are known to attempt to cancel the echo signals produced at the near end when the far end is transmitting by generating echo estimation data corresponding to a portion of an amplified *downlink* audio signal 472 traveling through the acoustic coupling channel 72. (Specification paragraph 6, Fig. 1, Fig. 4). Other examples may be found in the specification as well.

Regarding Amplifier 430 of Fig. 4, one skilled in the art would understand the amplifier 430 receives the downlink audio signal 470 and in response produces an amplified downlink audio signal 472. One skilled in the art would also understand that the Amplifier could also receive playback audio signal 439 as well.

Reconsideration and withdrawal of the objection to the specification is requested.

35 U.S.C. § 103 REJECTIONS

The office action rejects claims 1-6, 9-11, 18-23 under 35 U.S.C. § 103(a) based on Fig. 1 in view of U.S. Patent No. (5,646,991) to Sih (Sih). The Applicants respectfully disagree and submit the following arguments showing that the rejection is improper. The office action acknowledges that Fig 1 does not show 1) a noise suppression stage coming after the 'pre-noise suppression logic but 2) before the echo canceler filter.

According to the office action, Sih's high pass filter 146 can modify Fig. 1 to implement a high pass filter before either echo cancellation stage in order to remove a portion of the background noise. However, Sih explicitly teaches a high pass filter 146 (equate to the noise suppression logic by the examiner) *before* the echo canceler to directly receive the sum of the echo signal y(n) and the near-end speech signal v(n). (Sih, column 9, lines 25-30, Fig. 5). Thus, the office action suggests modifying Fig. 1 to add Sih's high pass filter 146 before the echo

canceler 84 to directly receive the sum of the echo signal y(n) and the near-end speech signal v(n). Id. Further, Fig.1 modified by Sih teaches the high pass filter 146 to directly receive the sum of the echo signal y(n) and the near-end speech signal v(n) rather than receiving the pre-noise suppression uplink data. Id. In other words, since Sih explicitly teaches that the high pass filter 146 filters the sum of the echo signal y(n) and the near-end speech signal v(n) and is before the echo canceler, then Fig. 1 modified by Sih teaches adding the high pass filter 146 to microphone 70 (or A/D 60 if digital) and thus the high pass filter 146 must be before the pre-noise suppression logic rather than afterwards as claimed. (Sih, column 9, lines 25-30, Fig. 5).

The Office Action does not cite to any reference nor does the office action even purport that any reference teaches, among other things each and every of the following elements, "...noise suppression logic, operatively coupled to the pre-noise suppression logic, and operative to receive the pre-noise suppression uplink data and in response to produce noise suppressed uplink data" and "an echo canceler filter, operatively coupled to the noise suppression logic and to the echo canceler coefficient logic, and operative to receive the noise suppressed uplink data and the filter coefficient data and in response to produce final uplink data." If the examiner maintains the rejection, Applicants request that the examiner show where the combined references teach each and every element of the claims pursuant to CFR 104(C)(2) and M.P.E.P. 2132. The Examiner should now concede that the combinations of the references combined as suggested in the office action does not teach, among other things, "...noise suppression logic, operatively coupled to the pre-noise suppression logic, and operative to receive the pre-noise suppression uplink data and in response to produce noise suppressed uplink data" and "an echo canceler filter, operatively coupled to the noise suppression logic and to the echo canceler

coefficient logic, and operative to receive the noise suppressed uplink data and the filter coefficient data and in response to produce final uplink data."

For at least these reasons, the office action fails to show how the references combined as suggested in the office action teach each and every element in the claims and therefore fails to establish anticipation. As a result, fails to establish a prima facie case of obviousness for independent claims 1, 9, 13, 18 and 22.

The office action rejects claims 13-17 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication US20040078104A1 "Nguyen" in view of Sih and further in view of U.S. Patent No. 6,891,954. The Office Action acknowledges that Nguyen does not disclose an echo canceler in the car audio system or an amplifier as claimed. Applicant reasserts the relevant remarks made above with regards to Sih, and as such these claims are in condition for allowance for at least these reasons.

Regarding the dependent claims, the claims dependent on allowable independent claims 1, 9, 13, 18 and 22 adding further limitations are thus also allowable for at least the reasons the independent claims are allowable. Reconsideration and withdrawal of the rejections is respectfully requested.

CONCLUSION

Applicants respectfully submit that the claims are in condition for allowance, and an early Notice of Allowance is earnestly solicited. The Examiner is invited to telephone the below-listed attorney at 847-862-0021 if the Examiner believes that a telephone conference will expedite the prosecution of the application.

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